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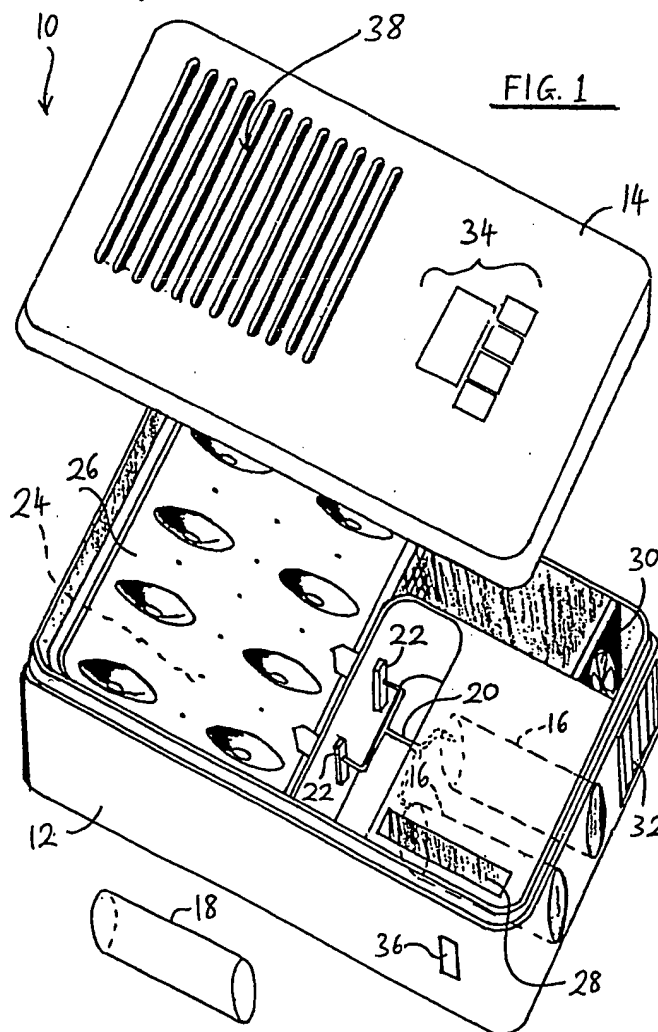
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GB 2167546 A EP 0367695 A1 US 4726767 A

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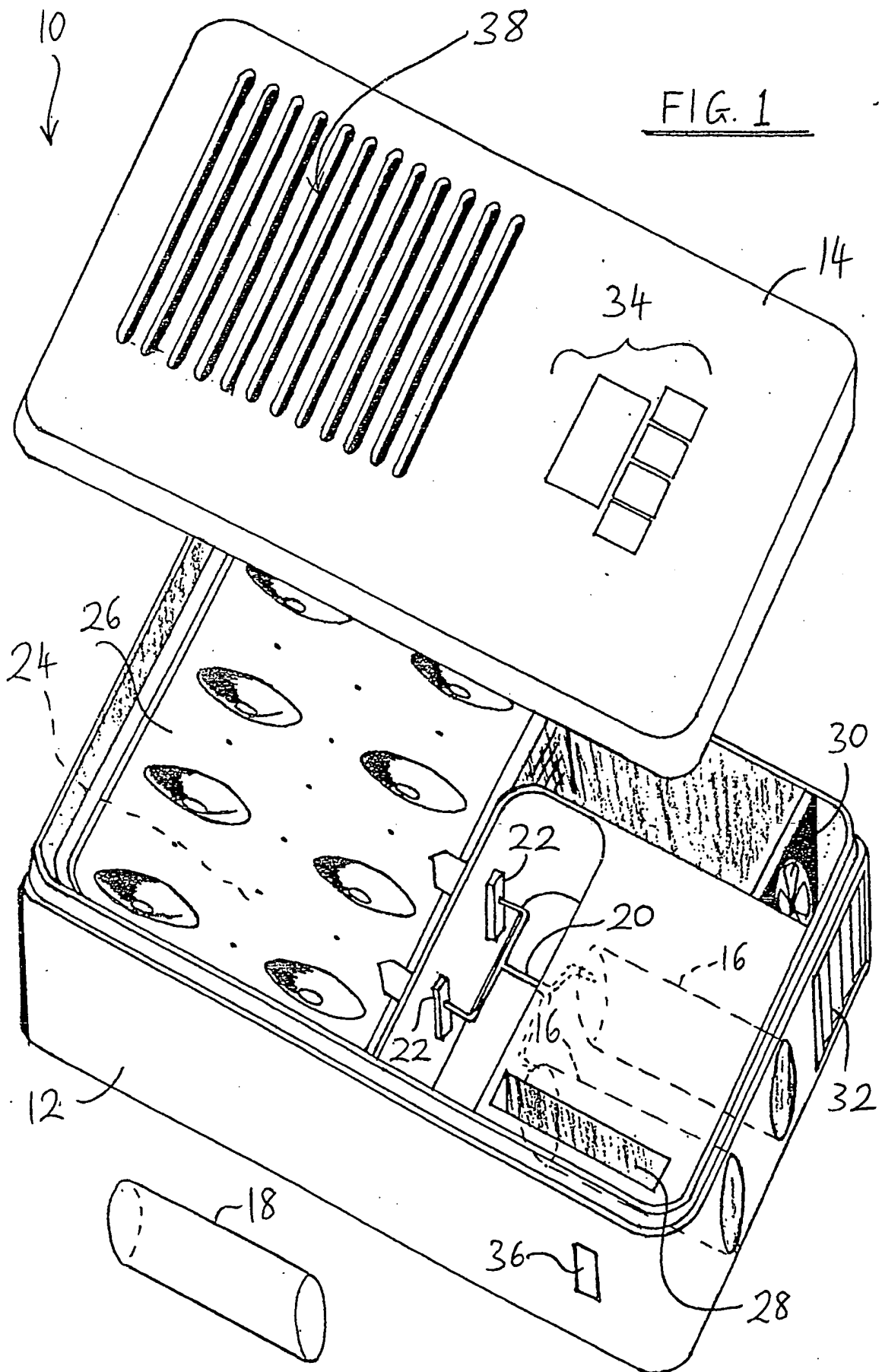
(54) Portable space heating device

(57) A portable heating device (10; Figure 1) suitable for providing forced convection heating of a confined or relatively confined space, such as the interior of a vehicle prior to use, is adapted to be fuelled by at least one replaceable reservoir (18) of a combustible gas. The or each such reservoir is preferably afforded by a respective replaceable canister of liquefied butane gas, such as are widely available for fuelling portable heated hair curling tongs.



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Title: "Heating Device" 1

Description of invention

This invention relates to a device intended primarily, although not exclusively, for use in convection heating a confined or relatively confined space, for example a car interior prior to use.

There is a problem in cars and other light vehicles that in general it is necessary to start a journey with the interior space cold. This is because although such vehicles are commonly provided with built-in means for heating the interior space, this heating means derives its heat from the vehicle engine and so provides heat only after the engine has warmed up sufficiently, some time after starting. Consequently, for the first few miles or so of travel, on a cold day it is commonplace for the vehicle interior to be uncomfortably cold and there is a related problem that the breath of the occupant(s) tends to condense on the interior surfaces of the windows, causing visibility problems and the inconvenience of having to wipe the windows clean.

Furthermore, if a vehicle is left parked on a cold day or left overnight, there is a tendency for water vapour present in the air inside the vehicle to condense on the interior glass surfaces, which will thus often need to be cleared by the occupant(s) on return to the vehicle, before a journey can safely commence. Moreover, during cold winter periods if the vehicle is left outdoors, particularly overnight, it is commonplace for frost to form on the exterior surfaces of the windows, and any condensation on the interior surfaces of the windows may freeze to form a frost-like layer also, and conventionally any such frost or the like must at least partially be scraped away, before a journey can safely or reasonably safely commence.

It is an object of the invention to overcome or substantially reduce these problems.

According to the invention, there is provided a portable heating device suitable for providing convection heating of a confined or relatively confined

space, such as the interior space of a vehicle prior to use, the device being adapted to be fuelled by at least one replaceable reservoir of a combustible gas.

The or each such reservoir is preferably afforded by a respective replaceable canister of liquefied butane gas, such as are widely available from chemists and other retail outlets for fuelling portable heated hair curling tongs (such as the "Braun Independent" range, for example)

It is to be appreciated however that whereas in said curling tongs heat is transmitted to the hair, which in use is in almost immediate proximity to the combustion zone, by conduction or radiation, the present invention is concerned with use of such canisters in a convective space-heating context, which to the applicant's knowledge has never hitherto been suggested.

The invention also provides a pack, the pack comprising a heating device in accordance with the invention together with at least one replaceable reservoir of combustible gas suitable for use therewith.

One embodiment of the invention will now be described in detail, by way of example only, with reference to the accompanying drawing, Figure 1, which is a partly exploded perspective view of a portable heating device in accordance with the invention, also showing a replaceable canister of combustible gas suitable for use therewith.

Referring to the drawing, a portable heating device 10 in accordance with the invention comprises a main body 12 and a detachable lid 14. The main body 12 is provided at one end with two compartments 16, each generally cylindrical and adapted to receive a respective replaceable canister 18 (only one of which is illustrated) of a combustible gas, in this example liquefied butane gas, each canister 18 being generally cylindrical and being of the type popularly available for fuelling heated hair curling tongs. Such canisters 18 are typically of plastics material, and are pierced/opened by contact with respective end portions of a manifold pipe 20, upon insertion of the canisters into compartments 16, the pipe 20 consequently conveying the butane gas from the canisters to mini-burners

22 accommodated in the main body 12. The canisters 18 thus act as fuel reservoirs for the device 10.

The left hand portion (as illustrated) of the main body 12 is in the form of a chamber 24 which is in communication with the mini-burners and which has a perforated upper wall 26. Chamber 24 envelopes a non-combustible mass of wire wool, gauze or the like permeated by the burning butane gas in use and which is effective to prevent any naked flame so produced from escaping from the main body 12. Said wire wool, gauze or the like may itself act as a catalytic bed to promote combustion of the fuel or may be coated with any suitable catalyst to promote such combustion.

The main body 12 comprises a battery compartment 28 for housing a dry cell or the like for powering a fan 30 for drawing air into the main body 12, through a vent 32, and directing it into the combustion chamber 24 (this also having the effect of forcing already-heated air out of the chamber 24), and also provides power (via wiring, not shown) to a push-button electronic or electrical control panel 34 on the lid 14. It will be appreciated that the lid 14 is detachable to permit changing of said battery, and general servicing. A temperature sensor 36 is provided on the main body 12, for sensing the surrounding ambient air temperature, and providing an electrical signal indicative thereof.

The lid 14 includes a slotted grille 38, through and from which air heated by said combustion may rise so as to provide convection heating of a confined or relatively confined space in which the device 10 may be placed in use.

Associated with the panel 34 there is a control microprocessor (not shown) capable of:

- (i) providing signals to switch on, or switch off, flow of the butane gas through the mini burners 22, by controlling valve means associated with the manifold pipe 20;
- (ii) providing signals to ignite the gas by an electrical ignition method (eg spark ignition);

- (iii) Carrying out timing operations, such as for automatically controlling the duration of heating operations (eg in accordance with user-programmed instructions) and/or for causing a heating operation to be initiated after some predetermined time has passed;
- (iv) receiving signals from the sensor 36 for switching off or switching on heating operation in thermostatic manner according to whether the sensed ambient temperature is less than or exceeds a predetermined or programmed datum level.

Additionally, the panel 34 provides for manual operation, by pressing the appropriate buttons, to switch on, or switch off, a heating operation.

The problems conventionally associated with vehicle interiors, especially at the start of a journey on cold days, are set out in the introductory part of this specification, to which reference is here expressly directed. These problems may be overcome by placing the device 10 in accordance with the invention in the interior space of the vehicle a suitable period of time prior to use of the vehicle, whereby with the device 10 so placed and switched on, or programmed to switch on (to initiate combustion) some time before use of the vehicle is required, the device 10 is able to provide convection heating of the air in said interior space, thus warming up said interior space to a more comfortable temperature prior to use, and lessening or preventing formation of condensation on the interior surfaces of the vehicle windows.

The device 10 may conveniently be placed, with the lid 14 uppermost, on a horizontal or approximately horizontal surface of the vehicle interior eg. in a footwell of the vehicle, and in this particular example the device 10 illustrated is provided with means (not shown) such as a hook, or releasable strap or other releasable fastening or clip, by which it may be hung from (or otherwise attached to) the steering wheel (or other control member) of the vehicle prior to use of the vehicle, the steering wheel location being especially desirable for preventing or reducing condensation on that part of the windscreen which, in the driving of the vehicle, lies directly in the driver's line of sight and also for effecting or assisting defrosting of the exterior and/or interior surface(s) of the windscreen or

preventing or reducing frost formation thereon. In general, frost formation on any of the windows of the vehicle may be countered, by use of the device 10.

It will be appreciated that the lid 14, in combination with the top wall 26 and said wire wool/gauze, afford a convenient safety shield, preventing naked flame from emanating from the device 10 in use.

The device 10 illustrated has approximate dimensions of 9 inches length (220mm approx), 6 inches width (150mm approx) and 2 inches height (50mm approx).

When either of the canisters 18 is exhausted, it may be pulled from the respective compartment 16, and replaced by another such canister 18 of the same type. The otherwise open ends of the compartments 16 are provided with removable snap-fitting covers (not shown) for retaining the canisters 18 in the compartments 16.

As an alternative to using an internally accommodated battery, any necessary electrical power could if desired be drawn from the vehicle electrical system, for example via a cigar or cigarette lighter socket of the vehicle.

Other thermostat means eg purely mechanical thermostat means, may be utilised if desired.

The control circuit may be programmed with a number of safety features. Thus, another temperature sensor could be provided near the grille 38, to sense the temperature of air near the grille 38, so as to ensure that there is a rise in that air temperature after the ignition has been operated, and programmed so as to switch off the gas supply if such temperature rise is not detected. Also, the control circuit may be programmed to check for a drop in the temperature adjacent to the grille 38 after the gas flow has been nominally switched off, and if such a drop in temperature is not detected, it may again provide a signal to switch off the gas flow and/or operate a visible and/or audible alarm.

The features disclosed in the foregoing description, or the accompanying drawing, expressed in their specific forms or in terms of a means for performing the disclosed function, or a method or process for attaining the

disclosed result, as appropriate, may separately or in any combination of such features be utilised for realising the invention in diverse forms thereof.

CLAIMS

1. A portable heating device suitable for providing convection heating of a confined or relatively confined space, such as the interior space of a vehicle prior to use, the device being adapted to be fuelled by at least one replaceable reservoir of a combustible gas.
2. A portable heating device according to Claim 1 wherein the or each such reservoir is afforded by a respective replaceable canister of liquefied butane gas.
3. A portable heating device according to Claim 2 wherein said canister is a replaceable canister of liquefied butane gas such as for fuelling portable heated hair curling tongs.
4. A portable heating device substantially as hereinbefore described with reference to and/or as illustrated in the accompanying drawings.
5. A pack, the pack comprising a heating device in accordance with any one of Claims 1 to 4 together with at least one replaceable reservoir of combustible gas suitable for use therewith.
6. A pack substantially as hereinbefore described with reference to and/or as illustrated in the accompanying drawings.
7. Any novel feature or novel combination of features described herein and/or illustrated in the accompanying drawings.

Examiner's report to the Comptroller under
Section 17 (The Search Report)

Application number

91 86.9

Relevant Technical fields

(i) UK CI (Edition K) F4K;F4W;F4S;B1F

(ii) Int CL (Edition 5) F24H

Search Examiner

A N BENNETT

Databases (see over)

(i) UK Patent Office

(ii) ONLINE DATABASES: WPI

Date of Search

22 MAY 1992

Documents considered relevant following a search in respect of claims

1;5

Category (see over)	Identity of document and relevant passages	Relevant to claim(s)
X	GB 2167546 A (MATSUSHITA) whole document	1-3,5
X	EP 0367695 A1 (APPLICATION DES GAY) whole document	1-3,5
X	US 4726767 A (NAKAJIMA) whole document	1-3,5

Category	Identity of document and relevant passages	Relevant to claim(s)

Categories of documents

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A: Document indicating technological background and/or state of the art.

P: Document published on or after the declared priority date but before the filing date of the present application.

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